

## ABSTRACT

Making it possible to execute the detection of the particles floating inside a processing chamber with the use of an optical system including one observing window and one unit (*An object of the present invention is, by using an optical system including one observing window and one unit, to make it possible to execute the detection of the particles floating inside a processing chamber.*) Also, in order to be able to detect exceedingly feeble particle scattered-lights with a high-accuracy, when performing a desired thin-film forming or thin-film processing treatment toward a to-be-processed target inside the processing chamber, the following method is employed: First, the irradiation with a beam is executed into the processing chamber through the observing window. Here, the beam is P-polarized and is intensity-modulated with a frequency differing from an exciting source's frequency and its integer-multiples, and the observing window has an inclination that forms Brewster angle toward the P-polarized incident beam. Next, backward scattered-lights scattered by the particles inside the processing chamber are received and image-photographed at a detecting optical system through the above-described one and the same observing window. Moreover, the above-described frequency component and a wavelength component of the above-described intensity-modulated beam are detected out of the received signals.

Finally, the detected components and the image-photographed image information are used so as to judge the number, the size, and the distribution of the particles.